

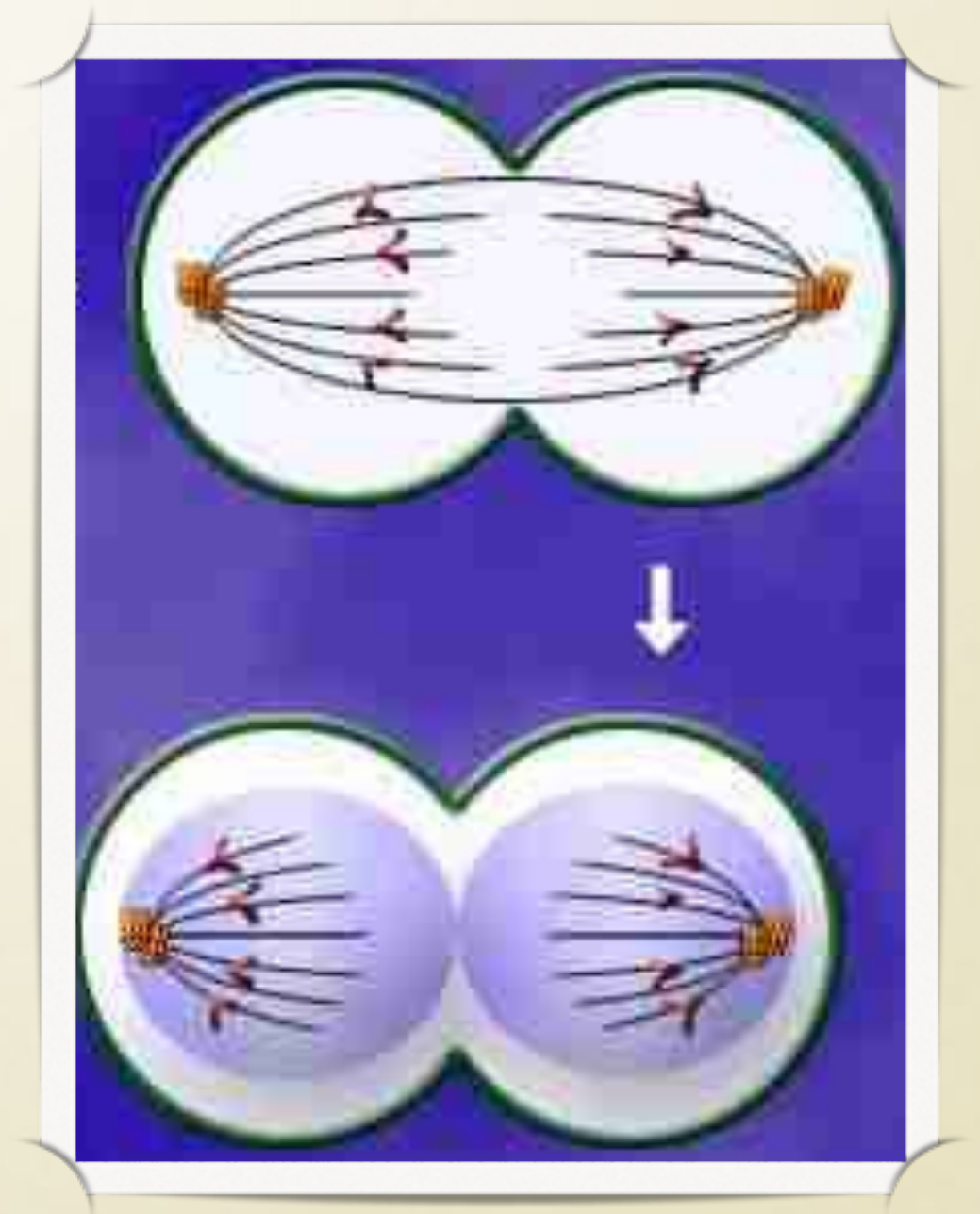
THE CELL CYCLE

INTRODUCTION TO MITOSIS

CELL DIVISION

The regular sequence of growth and division that cells undergo is known as the **cell cycle**.

The cell cycle is divided into three main stages.



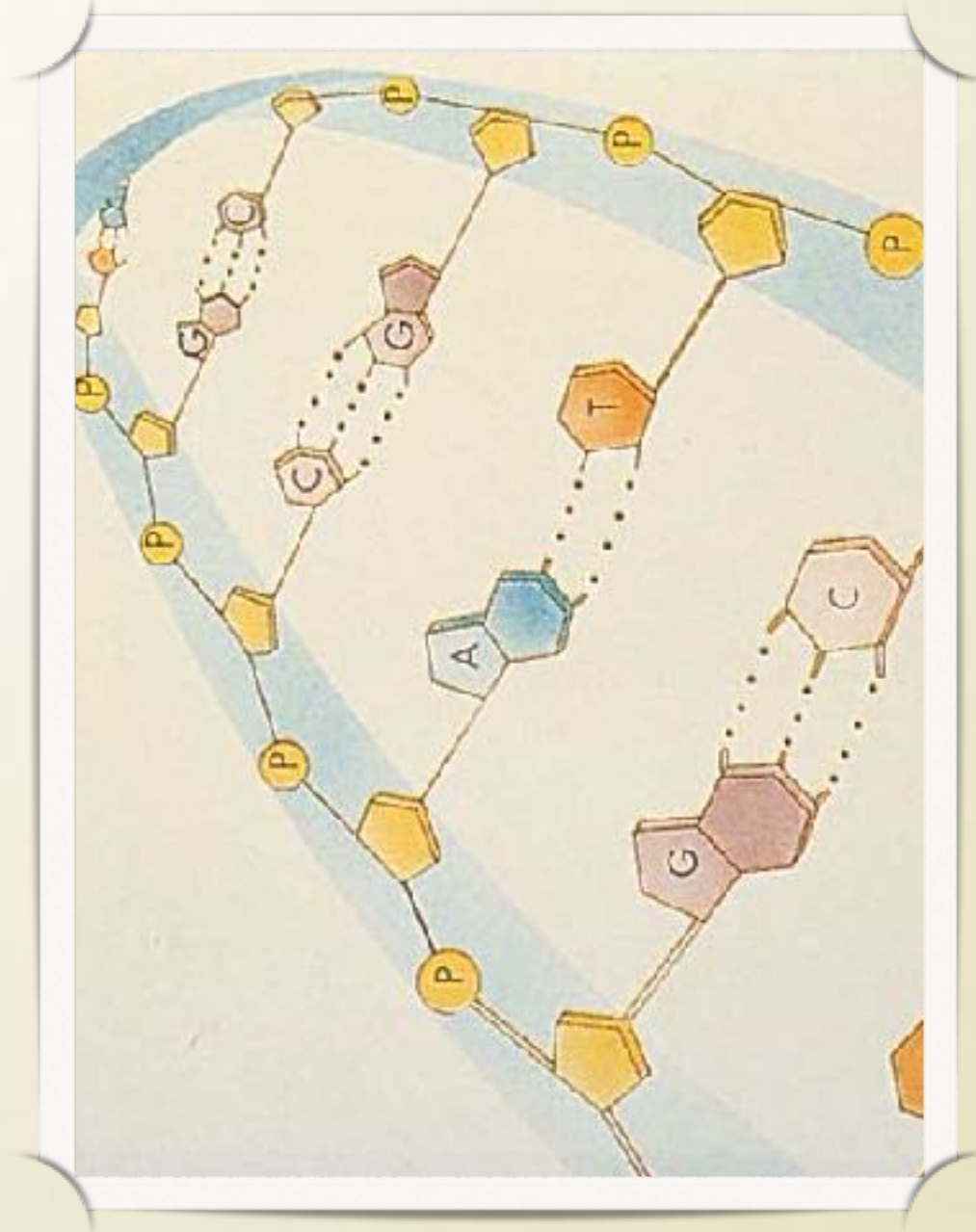
STAGE 1: INTERPHASE



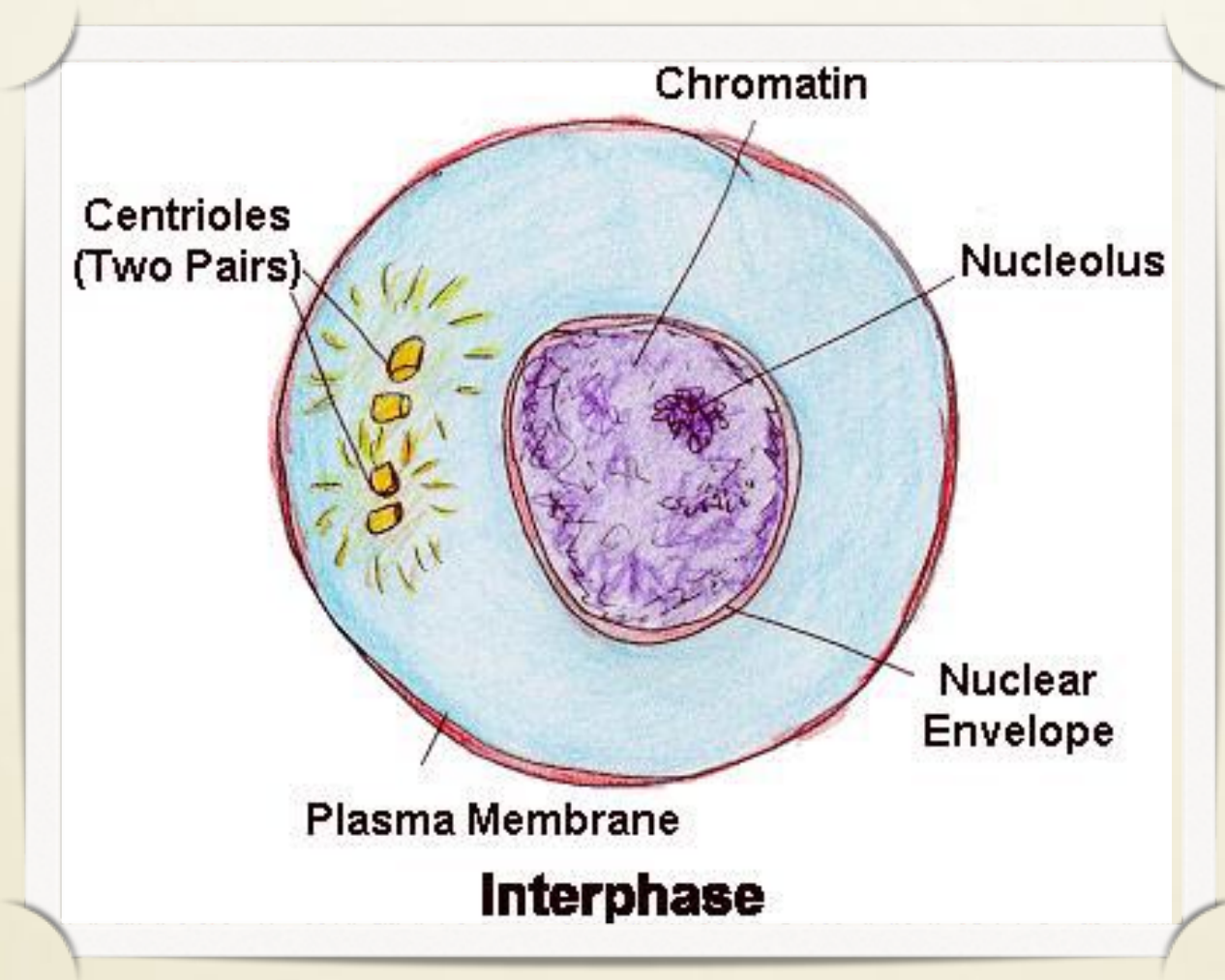
The first stage of the cell cycle is called **interphase**. During interphase, the cell grows, makes a copy of its DNA, and prepares to divide into two cells.

During the first part of interphase, the cell grows to full size and produces all the structures it needs. For example, the cell makes new ribosomes and produces enzymes. Copies are also made of both mitochondria and chloroplasts.

In the next part, the cell makes an exact copy of the DNA in its nucleus in a process called **replication**. Remember that DNA is found in the chromatin in the nucleus. The cell will now have two identical sets of DNA.



PREPARING FOR DIVISION



Once the DNA has replicated, preparation for cell division begins. The cell produces structures called centrioles that it will use to divide into two new cells. At the end of interphase, the cell is ready to divide.

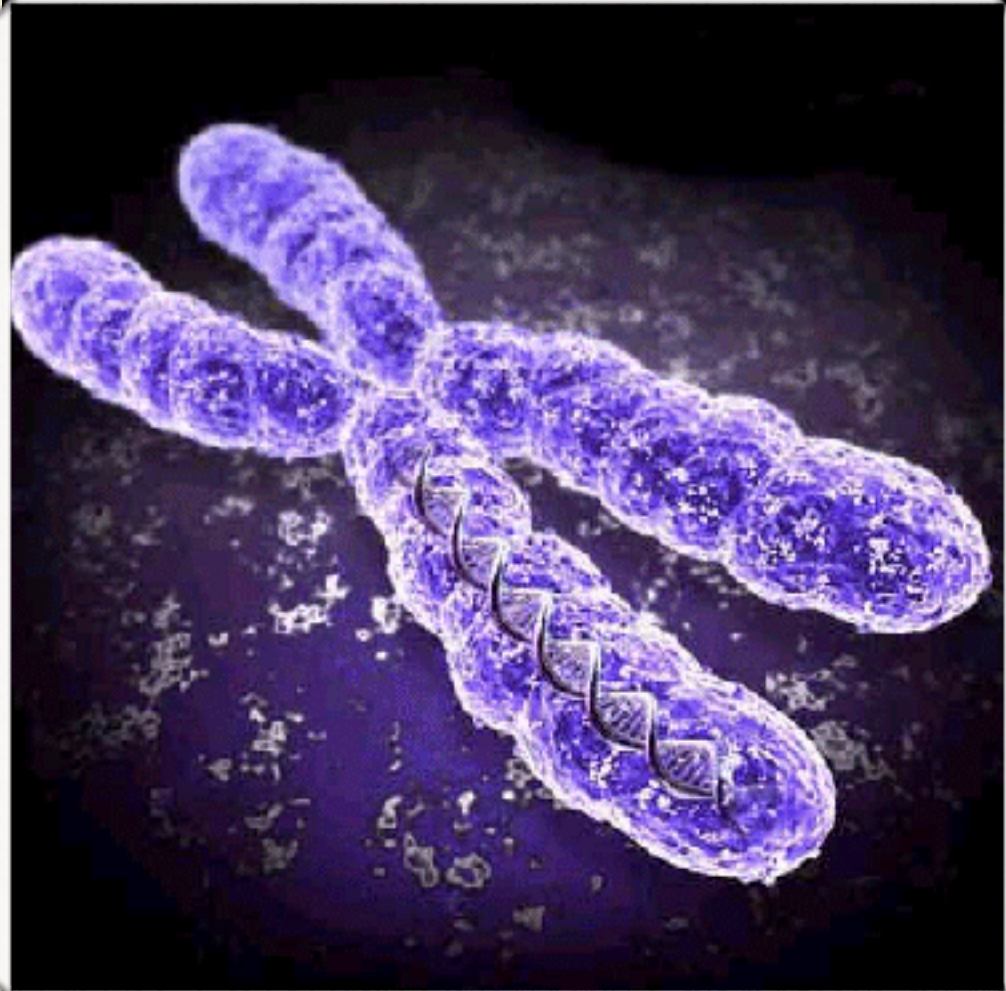
STAGE 2: MITOSIS

Once interphase is complete, the second stage of the cell cycle begins.

Mitosis is the stage during which the cell's nucleus divides into two new nuclei.

During Mitosis, one copy of the DNA is distributed into each of the two daughter cells.



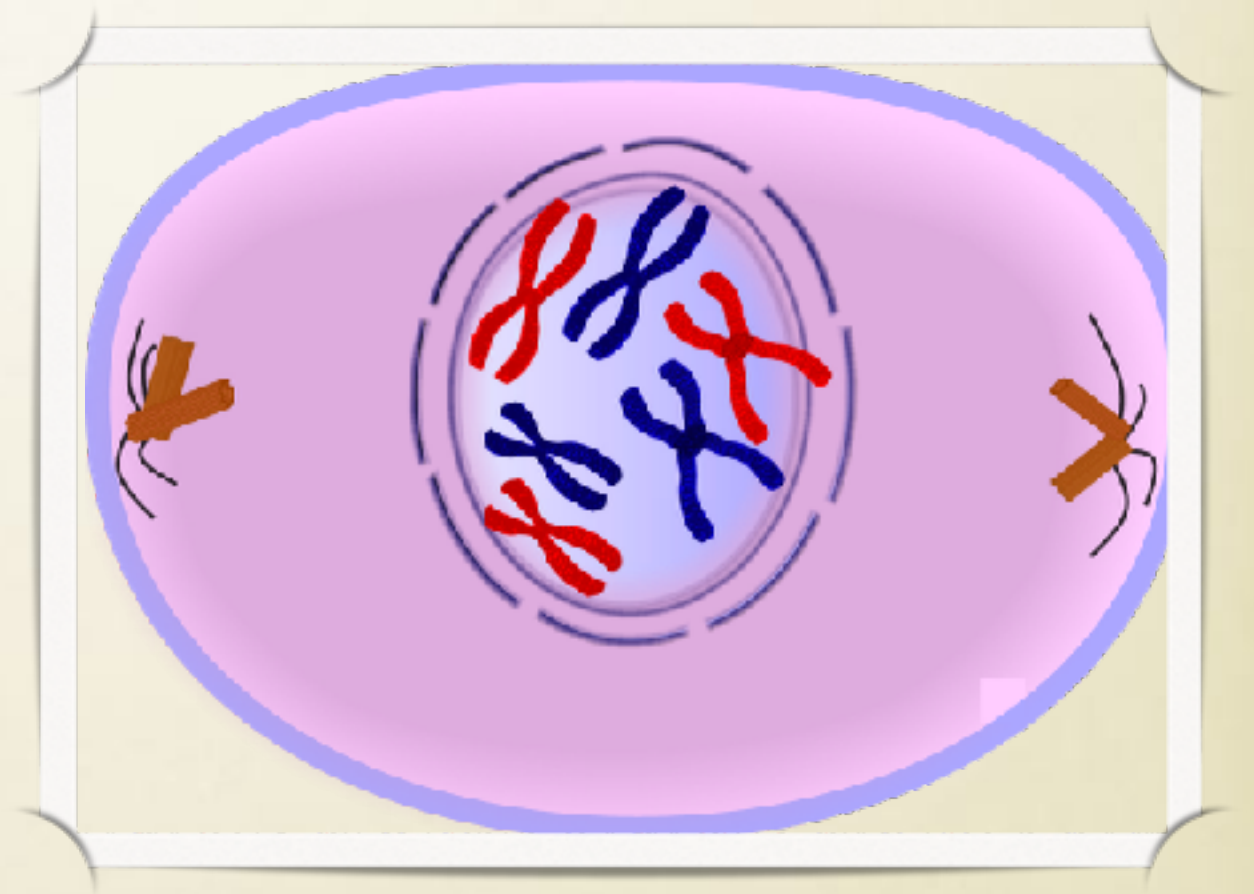


Scientists divide mitosis into four parts, or phases: prophase, metaphase, anaphase, and telophase.

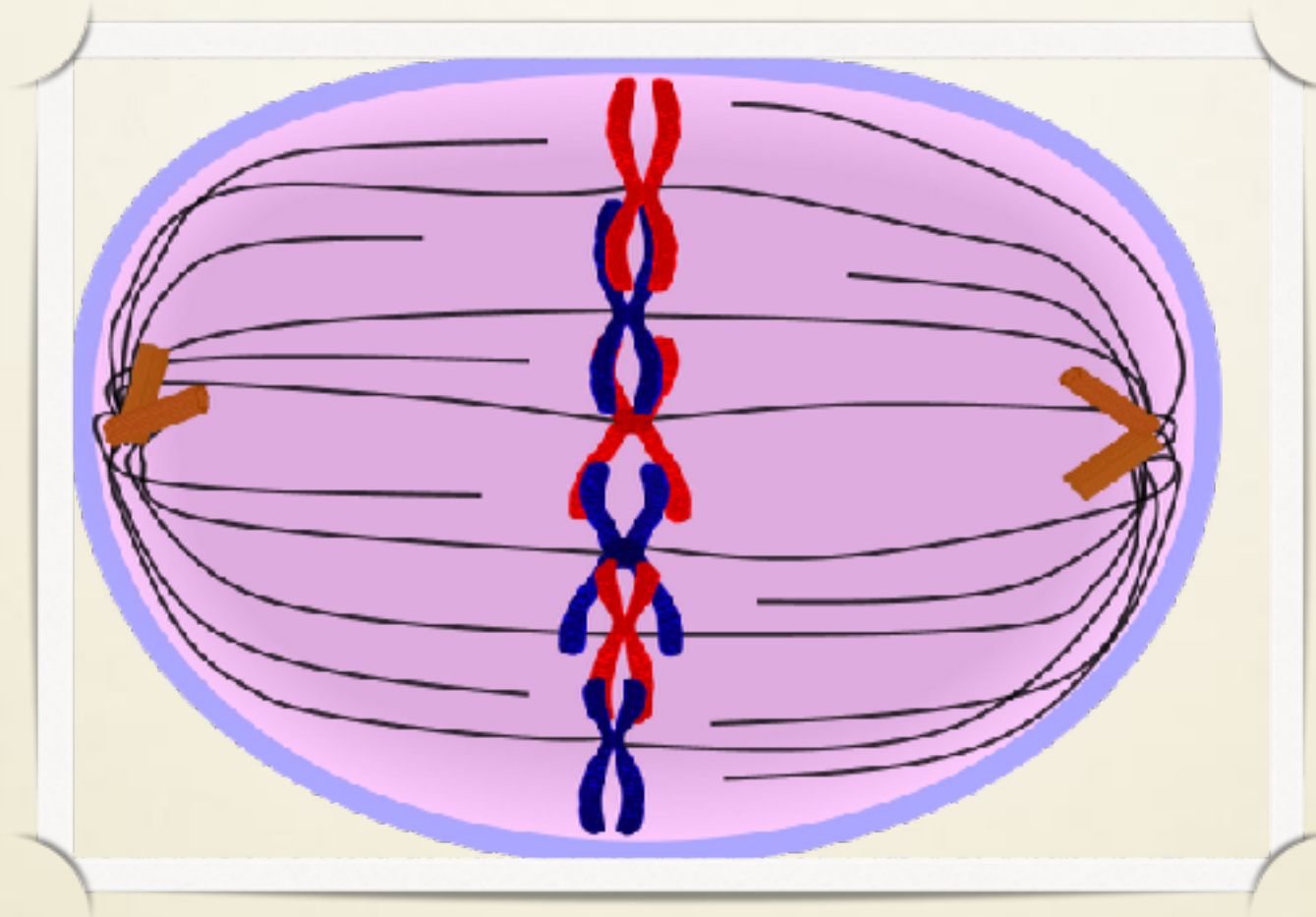
During prophase, the threadlike chromatin in the cell's nucleus condenses to form double – rod structures called **chromosomes**.

MITOSIS: PROPHASE

During Prophase, Chromatin condenses to form chromosomes. The pairs of centrioles move to opposite sides of the nucleus. Spindle fibers form a bridge between the ends of the cell. The nuclear envelope breaks down.



MITOSIS: METAPHASE



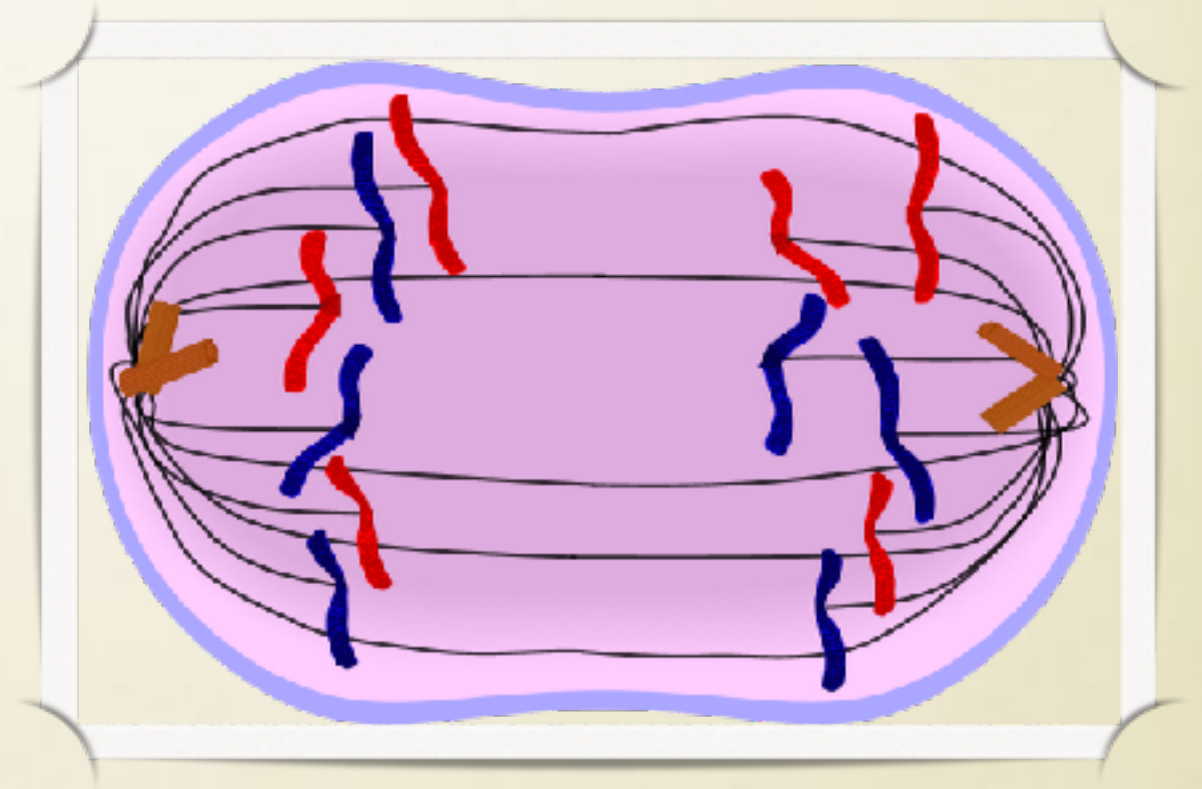
During metaphase, the chromosomes line up across the center of the cell. Each chromosome attaches to a spindle fiber at its centromere.

MITOSIS: ANAPHASE

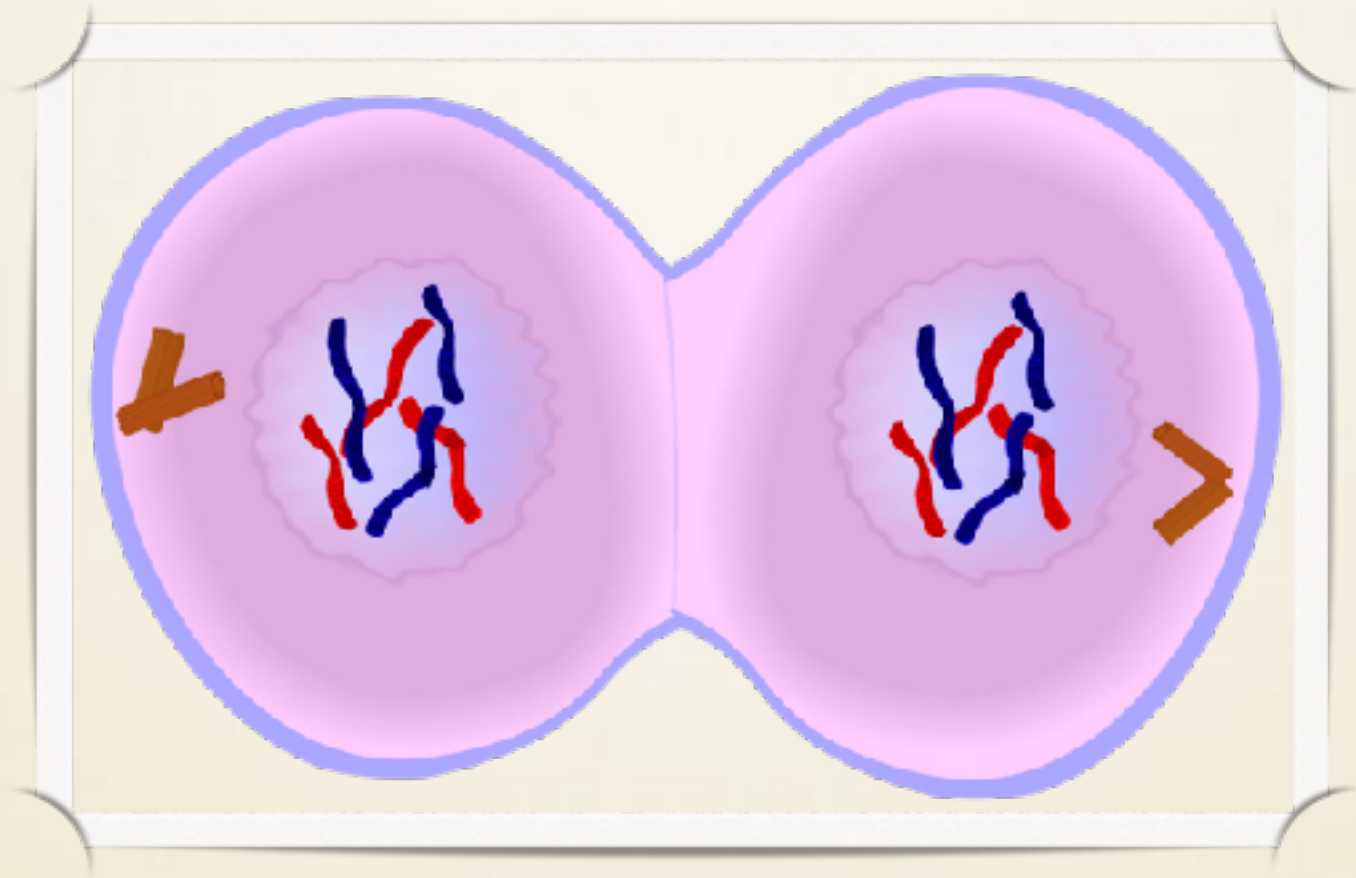
During anaphase, The centromeres split. The two chromatids separate.

One chromatid is drawn by its spindle fiber to one end of the cell. The other chromatid is drawn to the other end.

The cell stretches out as the opposite ends are pushed apart.



MITOSIS: TELOPHASE



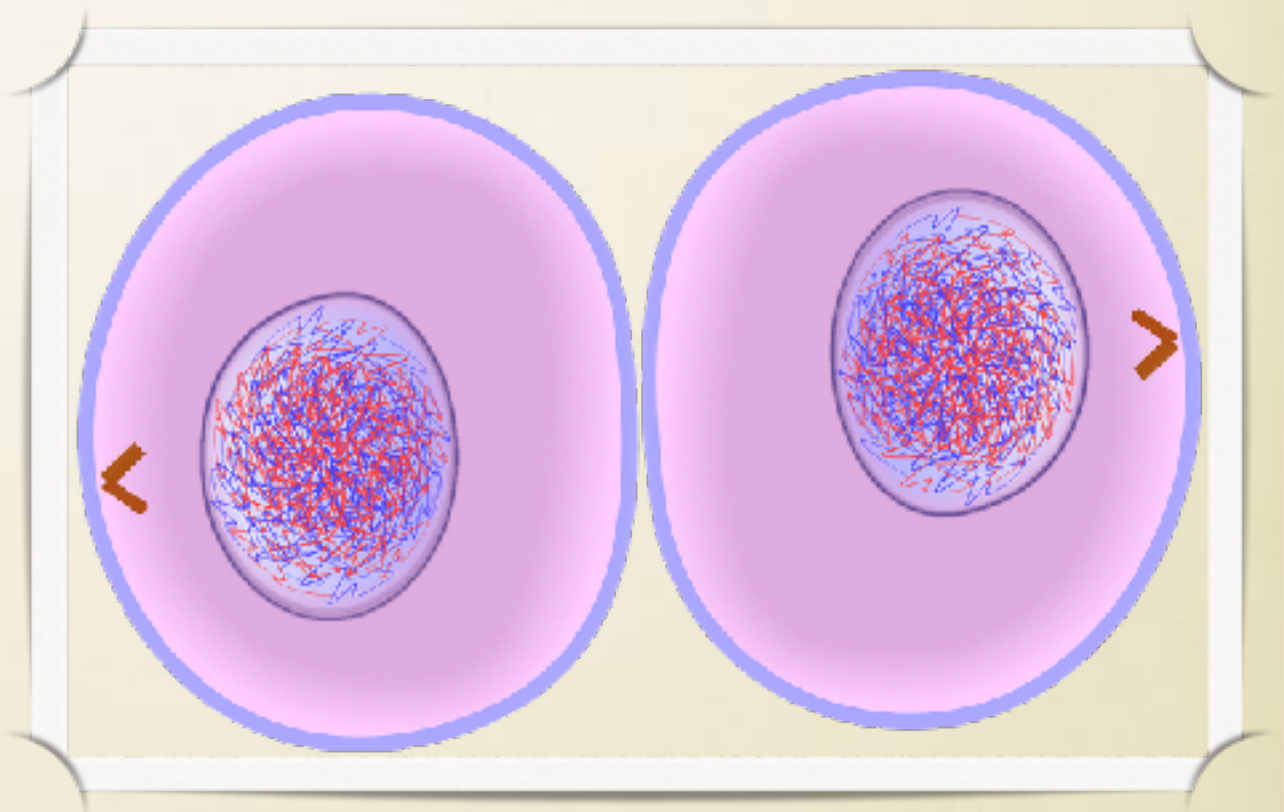
During telophase, the chromosomes begin to stretch out and lose their rodlike appearance.

A new nuclear envelope forms around each region of chromosomes.

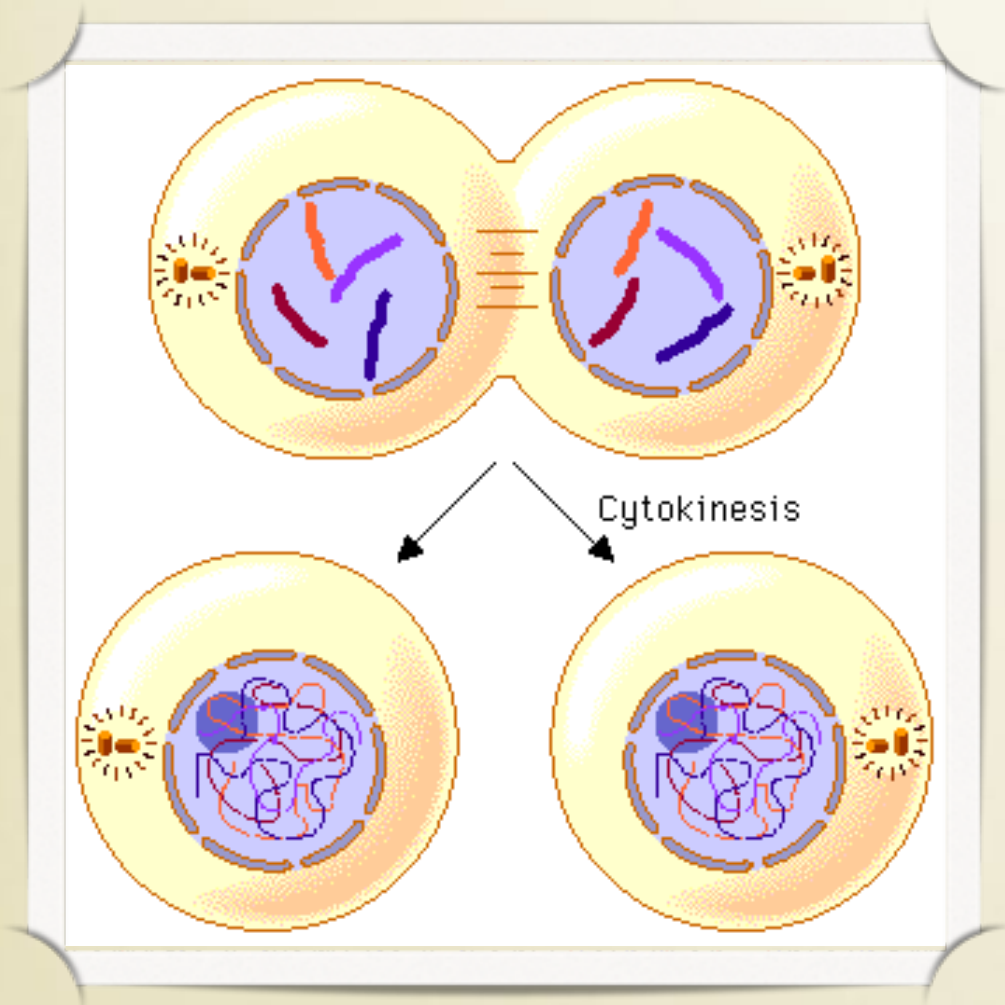
CYTOKINESIS

After mitosis, the final stage of the cell cycle, called cytokinesis, completes the process of cell division. During **cytokinesis**, the cytoplasm divides, distributing the organelles into each of the two new cells.

Each daughter cell has the same number of chromosomes as the original parent cell. At the end of cytokinesis, each cell enters interphase, and the cycle begins again. The length of each stage and cell cycle varies, depending on the type of cell.



CYTOKINESIS: ANIMAL CELLS



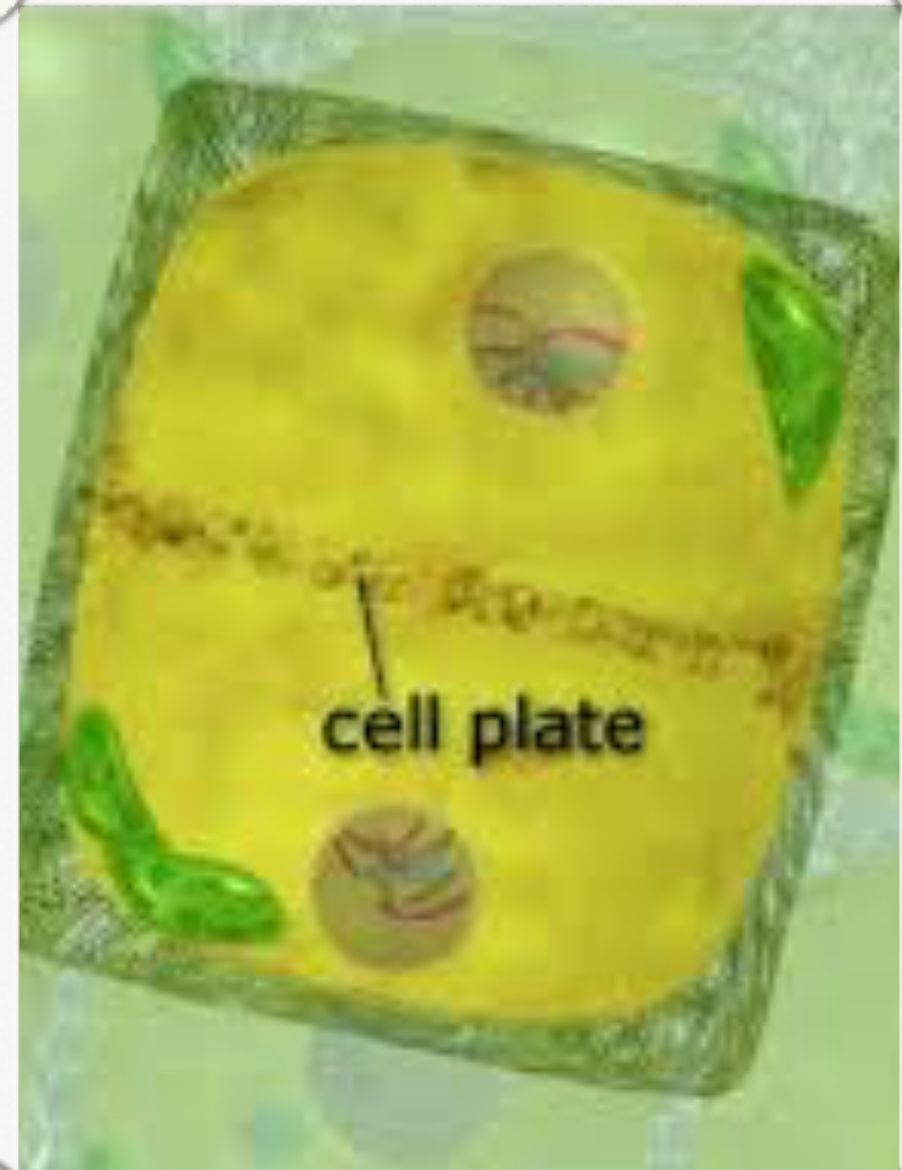
During cytokinesis in animal cells, the cell membrane squeezes together around the middle of the cell.

The cytoplasm pinches into two cells. Each daughter cell gets about half of the organelles.

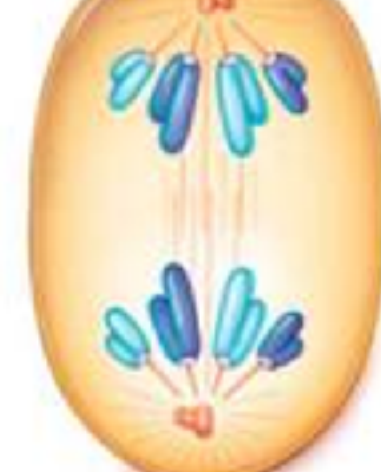
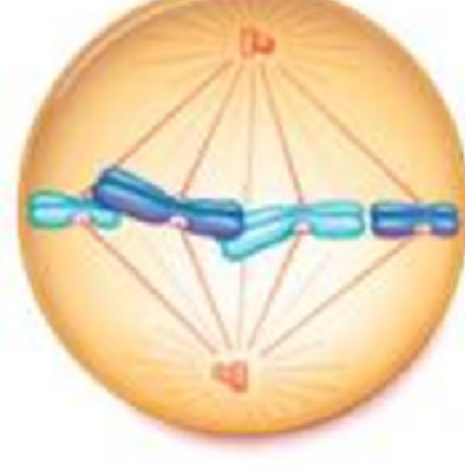
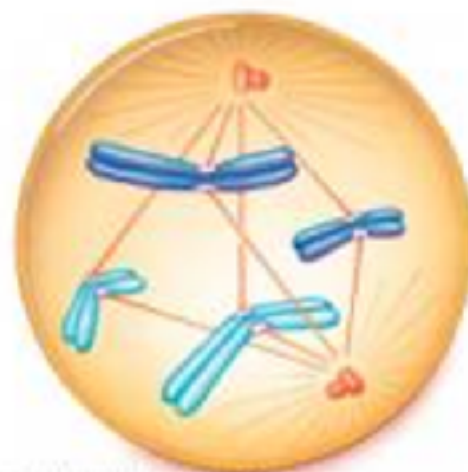
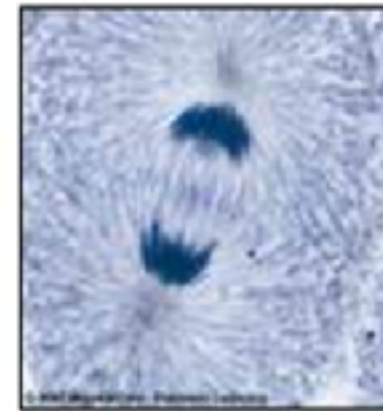
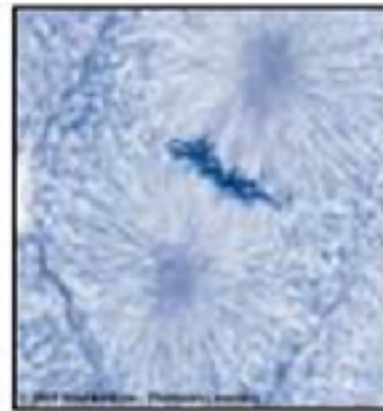
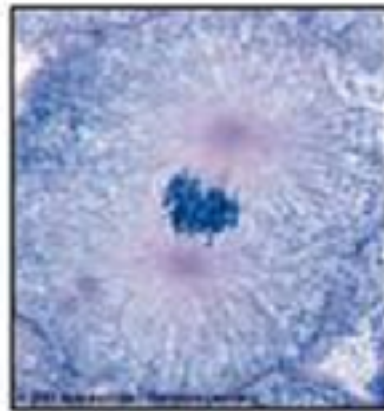
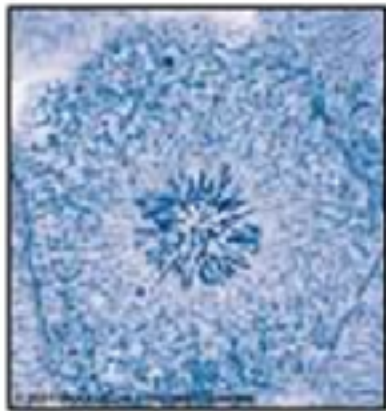
CYTOKINESIS: PLANT CELLS

During cytokinesis in plant cells, the rigid cell wall cannot squeeze together in the same way a cell membrane can. Instead, a structure called a cell plate forms across the middle of the cell.

The cell plate gradually develops into a new cell membrane between the two daughter cells. New cell walls then form around the cell membrane.



THE CELL CYCLE: REVIEW



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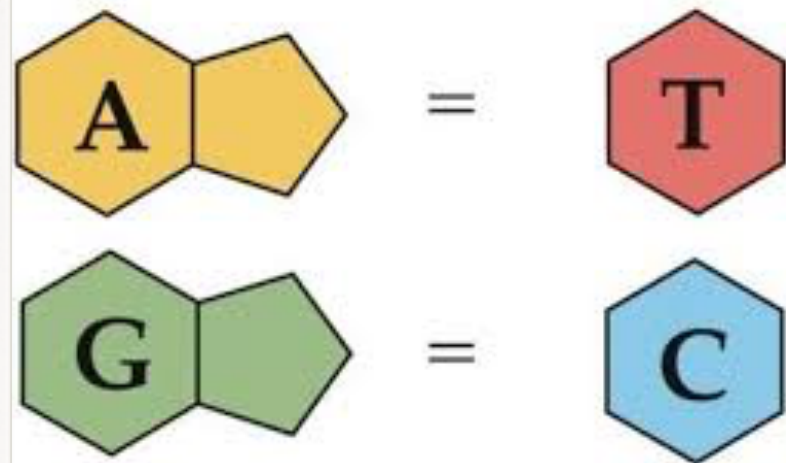
PROPHASE

ANAPHASE

METAPHASE

TELOPHASE

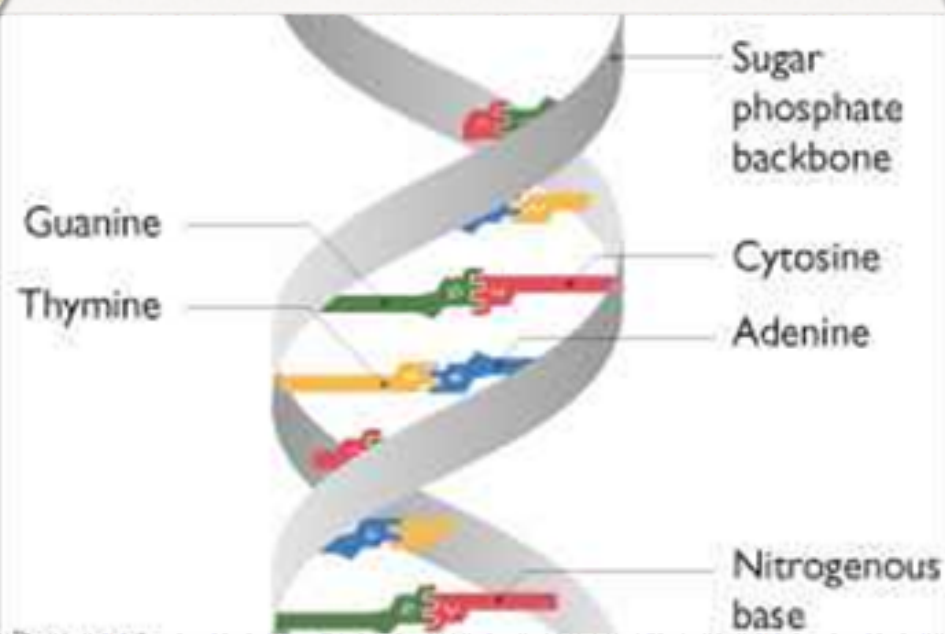
STRUCTURE OF DNA



DNA replication ensures that each daughter cell will have all of the genetic information it needs to carry out its activities. The two sides of the DNA ladder are made up of alternating sugar and phosphate molecules.

Each rung of the DNA ladder is made up of a pair of molecules called nitrogen bases. There are four kinds of nitrogen bases:

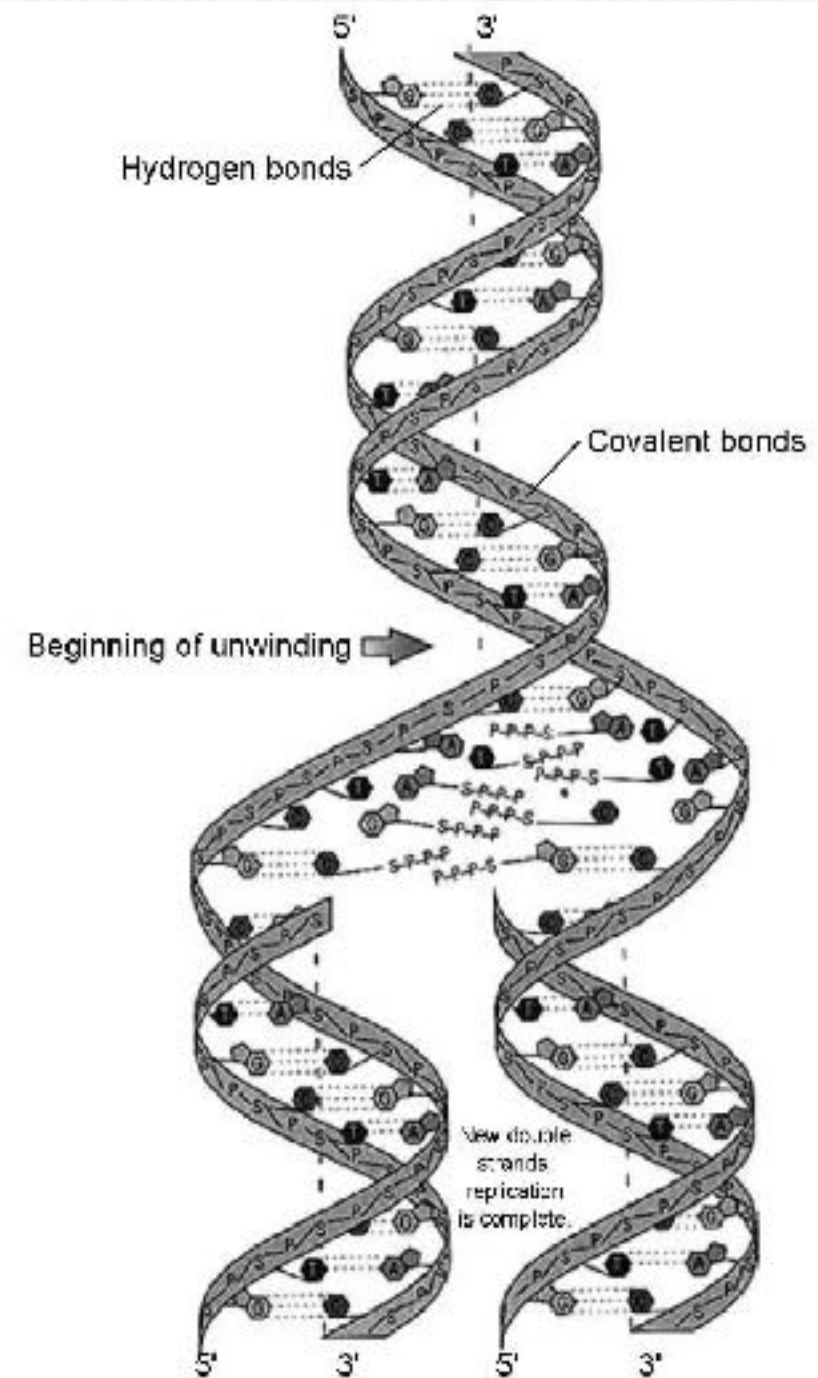
Adenine, Thymine, Guanine, Cytosine. Adenine only pairs with thymine, and guanine only pairs with cytosine.



DNA REPLICATION

DNA replication begins when the two sides of the DNA molecule unwind and separate. Next, nitrogen bases that are floating in the nucleus pair up with the bases on each half of the DNA molecule.

Because of the way in which the nitrogen bases pair with one another, the order of the bases in each new DNA molecule exactly matches the order in the original DNA molecule. Once the new bases are attached, the two new DNA molecules are formed.



KEYWORDS: **ENGLISH** - **SPANISH**

Cell Cycle - Ciclo celular

Interphase - Interfase

Replication - Replicación

Mitosis - Mitosis

Cytokinesis - Citoquinesis